

## **REMARKS**

Applicant would like to thank the Examiner for the detailed Office Action mailed on September 22, 2006.

Claims 1-20 are pending. Claims 1-4, 6-7, and 9-19 have been rejected. Claims 5 and 8 would be allowable if rewritten in independent form. Claim 20 has been allowed.

Claim 16 has been objected to for lacking antecedent basis for "said plurality of high voltage leads".

Claims 1-2, 6-7, 9-15, and 17-18 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Splain877 (U.S. Patent 3,502,877).

Claims 1, 3, 6, 9-15, and 17-18 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Splain067 (U.S. Patent 3,521,067).

Claims 1-3, 6-7, and 9-18 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Santurtun (U.S. Patent 4,601,051).

Claim 19 has been rejected under 35 U.S.C. 102 (b) as being anticipated by Boyer (U. S. Patent 6,205,200).

Claim 4 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Splain067 (U.S. Patent 3,521,067) or Santurtun (U. S. Patent 4,601,051).

## **Amendments**

The amendments are not to be construed as an admission by Applicant of the correctness of the objection or rejections. Claim 16 has been amended to overcome the antecedent basis objection noted by the Examiner.

## Request for Reconsideration

Applicant requests reconsideration of the rejection of Claims 1-4, 6-7, and 9-19.

### Rejections under 35 USC § 102

To anticipate a claim under 35 U.S.C. § 102 a single source must contain all of the elements of the claim. Lewmar Marine Inc. v. Barient, Inc., 627 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), cert. denied, 484 U.S. 1007 (1988). Moreover, the single source must disclose all of the claimed elements **“arranged as in the claim.”** (emphasis added) Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984). Moreover, **“[t]he identical invention must be shown in as complete detail as is contained in the ...claim.”** (emphasis added) Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q. 1913, 1920 (Fed. Cir. 1989). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference. Titanium Metals Corp. v. Banner, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985).

#### I. Splain 877 does not anticipate claims 1-2, 6-7, 9-15, and 17-18.

Applicant respectfully traverses the rejection of claims 1-2, 6-7, 9-15, and 17-18 because the Splain 877 fails to teach or suggest all of the elements of these claims.

The claimed invention is directed to suppressing overvoltage transients in an X-ray tube. Overvoltage in an X-ray tube can lead to “insulation breakdown”, “instable or uncontrollable high voltage regulation,” and repeated transient overvoltage can cause an “X-ray system” to become inoperative. See paragraphs 4-7 of the instant application.

Transient overvoltage in an X-ray tube originates from (a) voltage differences between the high voltage at the vacuum gap and the much lower voltage across the driving circuit, (b) floating high voltage structures, (c) discharges caused by insulator surface contamination, and (d) filament shorting at the cathode. See paragraphs 3-4 of the instant application.

The invention as claimed (claims 1-2, 6-7, 9-15, and 17-18) employs at least one voltage-clamping device coupled between high voltage elements to prevent the “occurrence of overvoltage transients” in a cathode circuit or in an imaging tube.

The Examiner asserts that Splain877 discloses such a device. The Examiner points to FIG. 3 and Col. 7 of Splain877. In particular, the Examiner asserts that resistor 130 of FIG. 3 is a clamping circuit as disclosed in Col. 7, lines 43-56. FIG. 3 of Splain877 discloses or shows the bleeder resistor 130 as being connected to the cathode voltage supply 16. Splain877, in Col. 7, lines 43-56, as suggested by the Examiner, does not refer to the bleeder resistor 130 as a clamping circuit. Nor can one impart the clamping function since Splain877 specifically discloses that the bleeder resistor 130 functions to “discharge external capacities in the system.” It appears that Splain877 uses the bleeder resistor 130 for the purpose of discharging the energy stored in the power source's capacitors or other components that store electrical energy. Splain877 does not disclose or suggest preventing overvoltage transients in an imaging tube.

Assuming, arguendo, that bleeder resistor 130 of Splain877 can be construed as a clamping circuit as the Examiner suggests, the rejection would still not be proper because Applicant's claims require the clamping device to be “coupled between said plurality of high voltage elements.” Splain877 does not disclose coupling of the bleeder resistor 130 between high voltage elements. In fact, the bleeder resistor 130 is coupled between a voltage and ground (zero voltage), which teaches away from Applicant's invention.

Since Splain877 does not disclose a voltage-clamping device, or voltage-clamping device coupled between a plurality of high-voltage elements to prevent “overvoltage transients”, the rejection of claims 1-2, 6-7, 9-15, and 17-18 should be withdrawn.

## II. Splain067 does not anticipate claims 1, 3, 6, 9-15, and 17-18

The invention as claimed employs at least one voltage-clamping device coupled between high voltage elements to prevent the “occurrence of overvoltage transients” in a cathode circuit or in an imaging tube.

The Examiner asserts that Splain067 discloses such a device. The Examiner points to FIG. 1 and Col. 3, lines 27-46. In particular, the Examiner asserts that variable resistor 18 performs the voltage clamping function. As disclosed in Splain067, variable resistor 18 limits the current flow to the filament 10F. The variable resistor 18, as described by Splain067, is a current device while the claimed invention calls for a “voltage-clamping device.” Additionally, the claimed invention calls for the voltage-clamping device to be coupled between high-voltage elements. Variable resistor 18 appears to be at the same voltage as filament 10F. The aim of the claims of “preventing occurrence of overvoltage transients” would not be met by variable resistor 18 because it is only meant to protect the filament 10F from being exposed to a large current.

The rejection should be withdrawn because Splain067 does not anticipate claims 1, 3, 6, 9-15, and 17-18 as explained above.

## III. Santurtun does not anticipate claims 1-3, 6-7 and 9-18

The invention as claimed employs at least one voltage-clamping device coupled between high-voltage elements to prevent the “occurrence of overvoltage transients” in a cathode circuit or in an imaging tube.

The Examiner asserts that Santurtun discloses such a device. The Examiner points to elements 29 and 31 of FIG. 2, and Col. 9, lines 28-34. Item 29 is a high-voltage

rectifier (HVR) and item 31 is a tube. Across from the HVR is a voltage divider 32. The Examiner asserts that voltage divider 32 is the claimed voltage-clamping device. As disclosed in Santurtun, Col. 6, lines 14-21, voltage divider 32 is a voltage-sensing device used by controller 33 to regulate the voltage being applied to tube 31. Further, the claimed invention calls for a voltage-clamping device coupled between high-voltage elements. Item 32 does not clamp the voltage as recited in the claims and is not coupled between a “plurality of high voltage elements.” Additionally, voltage divider 32 does not serve the purpose of “preventing the occurrence of overvoltage transients” as claimed.

The rejection should be withdrawn because Santurtun does not anticipate claims 1-3, 6-7, and 9-18.

#### IV. Boyer does not anticipate claim 19.

The invention as claimed is to a cathode circuit having a plurality of high-voltage elements that discharge when a voltage potential across “one gap is greater than a predetermined level.”

The Examiner asserts that FIG. 7 of Boyer discloses the cathode circuit. As disclosed by Boyer, the circuit in FIG. 7 is a marx generator positioned outside the X-ray tube assembly. See FIG. 1 where the X-ray unit 10 is made of distinct modules such as X-ray tube 16, marx generator 18, etc. In contrast, FIG. 2 of Applicant's invention shows an "imaging tube 30 includes an exterior housing 32 having an insert 34 and a cathode circuit 36 contained therein." Paragraph 25 of the instant application. Another discernable difference between the claimed invention and the Boyer is the use of an electric field to "extracts electrons from the cathode by the process of cold field emission." Boyer at Col. 4, lines 53-54. Yet another difference, Boyer does not disclose discharging when a voltage potential is "greater than a predetermined voltage level" as recited in the claims.

The rejection should be withdrawn because Boyer does not disclose claim 19 as explained above.

#### Rejection under 35 USC § 103

Claim 4 has been rejected under 35 U.S.C 103 as being unpatentable over Splain067 or Santurtun. Applicant respectfully traverses.

Section 2142 of the MPEP explains the Examiner's burden of stating a *prima facie* case of obviousness as follows:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. If, however, the examiner does produce a *prima facie* case, the burden of coming forward with evidence or arguments shifts to the applicant who may submit additional evidence of nonobviousness, such as comparative test data showing that the claimed invention possesses improved properties not expected by the prior art. The initial evaluation of *prima facie* obviousness thus relieves both the

examiner and applicant from evaluating evidence beyond the prior art and the evidence in the specification as filed until the art has been shown to suggest the claimed invention. ....To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Firstly, the Examiner acknowledges that Splain067 or Santurtun “do not specifically disclose the material of which the varistor is made” as recited in claim 4. However, the Examiner appears to have taken judicial notice that the “skilled artisan [can] fashion a varistor out of a metal oxide” as being well known in the art. If the Examiner has taken judicial notice, Applicant respectfully requests an affidavit or citation to prior art providing such a teaching as required by 37 CFR 1.104(d) (2) and MPEP § 2144.03. As noted by the Federal Circuit, deficiencies of the cited references cannot be remedied by the Examiner’s general “conclusions about what is 'basic knowledge' or 'common sense.'” In re Sang Su Lee, 61 USPQ2d 1430 at 1434-35 (quoting In re Zurko, 258 F.3d 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001)) (citation omitted). The Examiner’s assertion is too general and can apply to many cases.

Secondly, the Examiner has failed to state any motivation at all to combine Splain067 or Santurtun to meet Applicant’s claimed limitations, much less point to any such motivation in the prior art. Rather, the examiner has simply made a rejection of the form Splain067 or Santurtun teach Y; therefore, it would have been obvious “to form a varistor from metal oxides.” (See Office Action, pages 9 and 10). As the Federal Circuit

decision in In re Sang Su Lee (supra) makes clear, each and every element of the Applicants' claims must be supported by a prior art citation in order to reject the claims. Such a statement by the Examiner that it would have been obvious "to form a varistor from metal oxides.," Office Action at pages 9 and 10, is not supported by the prior art in view of the novel features of the invention.

Thirdly, the Examiner has not demonstrated that the disclosure of Splain067 or Santurtun recite all the elements of the claimed invention. The deficiencies of these patents as noted above are hereby incorporated by reference.

Claim 4 requires a "metal oxide varistor." However, the art of record do not disclose a metal oxide varistor. Splain067 or Santurtun do not disclose all the elements of the claimed invention. These are serious and distinct deficiencies in the cited disclosures. Therefore, on this point alone claim 4 is allowable. Thus, the application is in a state of allowance.

### CONCLUSION

Applicant believes this reply is fully responsive to all outstanding issues and places the application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned at the telephone number listed below.

Dated: December 12, 2006

Respectfully submitted,

By: \_\_\_\_\_  
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Marked Up Version Of The Pending Claims under 37 C.F.R. 1.121(c)(1)(ii): In accordance with 37 C.F.R. 1.121(c)(1)(ii), Applicant submits the following marked up version only for claims being changed by the current amendment, wherein the markings are shown by strikethrough (for deleted matter) and/or underlining (for added matter):

### **Amendment to the Claims**

1. (Original) A cathode circuit for an imaging tube comprising: a plurality of high voltage elements; and at least one voltage-clamping device coupled between said plurality of high voltage elements and preventing occurrence of overvoltage transients in the cathode circuit.
2. (Original) A circuit as in claim 1 wherein said plurality of high voltage elements have a low operating voltage therebetween.
3. (Original) A circuit as in claim 1 wherein said at least one clamping device is a varistor.
4. (Original) A circuit as in claim 3 wherein said varistor is a metal oxide varistor.
5. (Original) A circuit as in claim 1 wherein said at least one voltage-clamping device comprises a plurality of feedthrough holes.
6. (Original) A circuit as in claim 1 wherein said at least one voltage-clamping device is a resistive jumper.
7. (Original) A circuit as in claim 1 wherein said at least one voltage-clamping device is formed of a resistive material.
8. (Original) A circuit as in claim 1 wherein said at least one voltage-clamping device is a terminal board formed of resistive or semi-resistive material.

9. (Original) A circuit as in claim 1 wherein said at least one voltage-clamping device is a voltage clamping device or a current clamping device.

10. (Original) A circuit as in claim 1 wherein said at least one voltage-clamping device performs as an insulator when voltage potential between said plurality of high voltage elements is less than a predetermined differential voltage level.

11. (Original) An imaging tube comprising: a plurality of high voltage elements; and at least one voltage-clamping device coupled between said plurality of high voltage elements and preventing occurrence of overvoltage transients in the imaging tube.

12. (Original) An imaging tube as in claim 11 further comprising: a driving circuit; and a cathode coupled to said driving circuit via said plurality of high voltage elements.

13. (Original) An imaging tube as in claim 11 further comprising: a driving circuit; and a high voltage receptacle coupled to said driving circuit via said plurality of high voltage elements.

14. (Original) An imaging tube as in claim 11 wherein said plurality of high voltage elements exist within at least one of an imaging tube housing, insert, casing, cable assembly, cathode, flat connector, and high voltage receptacle.

15. (Original) An imaging tube as in claim 11 wherein said plurality of high voltage elements are a plurality of high voltage leads.

16. (Amended) An imaging tube as in claim ~~14~~ 15 wherein said at least one voltage-clamping device allows current flow between said plurality of high voltage leads when voltage potential between said plurality of high voltage leads is greater than a predetermined voltage level.

17. (Original) An imaging tube as in claim 11 wherein said at least one voltage-clamping device is formed of a resistive or semi-resistive material.

18. (Original) An imaging tube as in claim 11 wherein said at least one voltage-clamping device performs as an insulator when voltage potential between said plurality of high voltage elements is less than a predetermined differential voltage level.

19. (Original) A cathode circuit comprising a plurality of high voltage elements having at least one discharge gap with a predetermined width, said plurality of high voltage elements discharging across said at least one gap when a voltage potential across said at least one gap is greater than a predetermined voltage level.

20. (Original) An imaging tube comprising: a cathode cup; a cathode terminal board coupled to said cathode cup via a first set of high voltage elements; a high voltage receptacle coupled to said cathode terminal board via a second set of high voltage elements; and a plurality of voltage clamping devices coupled to and preventing occurrence of overvoltage transients across said first set of high voltage elements and said second set of high voltage elements.